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Prevalence of Rabies Antigen in Brain Tissue of Dogs Slaughtered for Human Consumption and Evaluation of Vaccination of Dogs Against Rabies in Aba, Abia State Nigeria

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ABSTRACT [ENGLISH/ANGLAIS]

Dog meat processing constitutes a great public health risk to dog handlers and butchers who may be exposed to rabies infection. Routine prophylactic vaccination of dogs is recommended for effective control of urban rabies. A cross sectional study and descriptive epidemiology was designed to detect the presence of rabies antigen in brain tissues of dogs slaughtered for human consumption in Aba, Abia state and to evaluate vaccination records at the Zonal Veterinary Clinic Aba. A total of 185 dog brains were tested for rabies antigen by direct fluorescent antibody technique, out of which 13 samples (7.0%) were positive for rabies antigen. A total of 39.5% of the samples tested were from male dogs. The rate of infection was higher in females (8.9%). Of the 12 individuals that were involved in the processing of dog meat, 8 (66.7%) had been bitten in the course of handling dogs in the last 12 months. Data obtained from clinic records between 2007 and 2012 showed that out of 3,169 dogs presented during the period, 42.7% received anti-rabies vaccination. The year 2007 had the highest vaccination rate (23.6%). About 58.2% of the dogs vaccinated were males with exotic breed having the highest vaccination rate (50.6%). Most of the dogs vaccinated (44.2%) were within the ages of 3-12 months. Seasonal index showed increase in vaccination rate during November and December. Dog meat processors may be exposed to rabies antigen during handling of dogs. Prevention of rabies among dog and human population requires adequate and well planned intervention through public health education and anti-rabies vaccination campaigns.

Keywords: Vaccination, rabies antigen, dog meat, Abia state

RÉSUMÉ [FRANÇAIS/FRENCH]

Transformation de la viande de chien constitue un grand risque pour la santé publique de maîtres-chiens et les bouchers qui peuvent être exposés à la rage. Vaccination prophylactique de routine des chiens est recommandée pour un contrôle efficace de la rage urbaine. Une étude transversale et épidémiologie descriptive a été conçue pour détecter la présence de l'antigène de la rage dans les tissus du cerveau de chiens abattus pour la consommation humaine à Aba, l'Etat d'Abia et d'évaluer les dossiers de vaccination à la clinique vétérinaire de zone Aba. Un total de 185 cerveaux de chiens ont été testés pour l'antigène de la rage par la technique d'immunofluorescence directe, dont 13 échantillons (7,0%) étaient positifs pour l'antigène de la rage. Un total de 39,5% des échantillons testés étaient des mâles. Le taux d'infection est plus élevé chez les femmes (8,9%). Sur les 12 personnes qui ont été impliqués dans le traitement de la viande de chien, 8 (66,7%) avait été mordu dans le cadre du traitement des chiens dans les 12 derniers mois. Les données obtenues à partir des dossiers de la clinique entre 2007 et 2012 a montré que sur 3169 chiens présentés au cours de la période, 42,7% ont reçu une vaccination antirabique. L'année 2007 a connu le taux de vaccination le plus élevé (23,6%). À propos de 58,2% des chiens vaccinés étaient des hommes avec race exotique ayant le taux de vaccination le plus élevé (50,6%). La plupart des chiens vaccinés (44,2%) étaient à l'intérieur de l'âge de 3-12 mois. Indice saisonnier montré une augmentation du taux de vaccination en Novembre et Décembre. Transformation de la viande de chien peuvent être exposés à l'antigène de la rage lors de la manipulation des chiens. Prévention de la rage chez les chiens et la population humaine nécessite une intervention adéquate et bien planifié par l'éducation de la santé publique et les campagnes de vaccination contre la rage.

Mots-clés: Vaccination, l'antigène de la rage, de la viande de chien, l'Etat d'Abia

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INTRODUCTION

Rabies is caused by a neurotropic virus of the genus lyssavirus of the family Rhabdoviridae, and is transmissible to all mammals including humans [1]. The disease is widespread in African domestic dogs and

certain wild canine populations [2]. It is estimated that approximately 50,000 to 100,000 human deaths occur annually from rabies per year worldwide [3]. Low anti-rabies vaccination tendency builds up susceptible dog

populations and favours large scale epizootic or focal outbreaks [4].

Dog meat is regarded as a delicacy and is consumed by some communities in Nigeria, thus constituting a great public health risk to dog handlers and butchers who may be exposed to the virus [5]. Even though some studies have shown prevalence of rabies antigens in the brain tissues of apparently healthy dogs slaughtered for human consumption in some parts of the country [6-11] confirming the presence of the disease and its health risk to the general public, there is a dearth of this information in many other parts of the country, including Aba, Abia state.

This study was designed to determine the presence of rabies antigen in brains of slaughtered dogs in Aba, Abia state and to obtain dog vaccination records from the Zonal Veterinary Clinic Aba, Abia state between year 2007 and year 2012.

MATERIALS AND METHODS

Study Area

The study was carried out in Aba, Abia state, Nigeria. It is an industrial city located in south east Nigeria with human population of 531,340 according to the 2006 population census. It lies between latitudes 5o 07' N and between longitude 7o 22'E [12].

Study Design

A descriptive epidemiology was used to evaluate vaccination records between 2007 and 2012 at the Zonal Veterinary Clinic Aba, Abia state, while a cross sectional study was carried out for the detection of rabies antigen in the brain of slaughtered dogs in Aba, Abia state.

Information on Vaccination of Dogs and Cases of Dog Bites in Humans

Information on rabies vaccination was obtained from the Zonal Veterinary Clinic Aba, Abia state. The existing vaccination records were evaluated for a period of seven years (2007 – 2012). Records of age (3 -12months, > 12-24 months and >24 months), sex (male and female), breed (exotic, local, cross) and the number of dogs vaccinated were assessed and recorded. Monthly variation of dog vaccination was also obtained to determine the seasonal index. Data generated was analysed using the statistical packages for social sciences (SPSS) Version 17.0 to carry out descriptive analysis. Data obtained were presented using tables and charts.

Fluorescent Antibody Test and Sample Collection

Brain samples from slaughtered dogs were collected between April and June 2013 from various slaughter points in Umude village, Ekiakpara, Faulks road and Ugbor hill at various relaxation places called 'joints' where dogs are slaughtered and processed for consumption. The brain samples were collected then stored in pre-labelled EDTA-free bottles at – 4oC and then transported to the Viral Zoonoses Laboratory of the Department of Veterinary Public Health and Preventive Medicine, Ahmadu Bello University, Zaria Nigeria for fluorescent antibody test as described by Dean et al.,[13].

RESULTS

Detection of rabies antigen among slaughtered dogs by direct fluorescent antibody (DFA) technique and information obtained from dog meat processors in Aba Abia state

A total of 185 dog brains were tested for rabies antigen by direct fluorescent antibody technique, out of which 13 samples (7.0%) were positive for rabies antigen. A total of 95(51.4%) and 45(24.3%) of the brain samples were collected in Umude village and Faulks road Aba (Table 1). A total of 39.5% of the samples tested were from male dogs while 60.5% were from female dogs. The rate of infection was higher in females (8.9%) than males (4.1%). Six (50%) of the individuals processing dog meat were within 31- 40 years of age and 5 (41.7%) of the individuals were residing in Umude village (Table 3). A total of 5 (41.7%) of the dog processors have been involved in the trade for a period of 1-5yrs, and 8(66.7%) of the individuals had been bitten in the course of handling dogs in the last 12 months (Table 4).

Table 1: Distribution of dog brain samples collected by location in Aba, Abia state

Location	No. of Sample Collected (%), n = 185	Sample Tested Positive
Umude Village (Osisioma Ngwa)	95 (51.4)	7/95
Ekiapara (Osisioma Ngwa)	30(16.2)	3/30
Faulks road (Aba North)	45(24.3)	1/45
Ugbor hill (Aba North)	15(8.1)	2/15
Total	185	13(7.0)

Table 2: Sex distribution of dogs slaughtered for human consumption in Aba, Abia state

Gender	Number Tested	Number Positive
Male	73	3/73 (4.1%)
Female	112	10/112(8.9%)
Total	185	13/185(7.0%)

Table 3: Biodata of individuals involved in processing dog meat in Aba, Abia state

Variable	Frequency, n = 12	Percentage
Age		
>20	3	25
20-30	2	16.7
31-40	6	50
>40	1	8.3
Marital Status		
Single	3	25
Married	9	75
Sex		
Male	12	100
Female	0	0
Location were dogs are slaughtered		
Umude village	5	41.7
Ekiapara Faulks road	3	25
Ekiapara Faulks road	2	16.7
Ugbor hill	2	16.7
Educational qualification		
Primary	5	41.7
Secondary	0	0
Tertiary	0	0
None	3	33.3
Informal	4	25.0

Age, sex, breed, and year specific rates of dog vaccination at the Zonal Veterinary clinic Aba, Abia state from 2007 – 2012

Data obtained from clinic records from the Zonal Veterinary Clinic Aba, Abia state between 2007 and 2012 showed that out of a total of 3,169 dogs presented at the clinic during the period under study, 1354/3169(42.7%) dogs received anti-rabies vaccination. About 58.2% of the dogs vaccinated were males while 41.8% were females. Exotic breed had the highest vaccination rate (50.6%) while 34.9% and 14.5% of the vaccinated dogs were local and cross breeds respectively. Most of the dogs vaccinated (44.2%) were within the ages of 3-12 months followed by (38.6%) dogs in the age range > 12-24 months and 17.3% of dogs > 24 months (Table 1).

Seasonal index of monthly vaccination of dog and Annual distribution of total number of dogs vaccinated against rabies against total number of dogs attended to at the Zonal veterinary Clinic Aba Abia state from 2007 – 2011

Seasonal changes expressed as seasonal index showed the greatest values of vaccination of dogs against rabies during November and December (Figure 1). The year 2007 had the highest number of dogs vaccinated, 320/1354(23.6%) with the year 2012 having the lowest number of dogs vaccinated 118/1354 (8.7%) (Figure 2)

Table 4: Information obtained from dog meat processors in Aba, Abia state

Variable	Frequency	Percentage
How long have been involved in dog processing?		
1 – 5yrs	5	41.7
>5 -10 yrs	4	33.3
>10 yrs	3	25
Have you been bitten in the last 12 months?		
Yes	8	66.7
No	4	33.3
Where do you source dogs from?		
Within the Local government	6	50
From other Local government	0	0
Outside the state	6	50
Rabies can be spread by bite of a rabies infected dog?		
Yes	3	25
No	9	75
What do you do when bitten by a dog?		
Go to the hospital	1	8.3
Use traditional method of treatment	8	66.7
Do nothing	3	25
Do you wash dog bite wounds with soap and water?		
Yes	0	100
No	12	0
Do you use personal protective equipment?		
Yes	1	8.3
No	11	91.7
Do you process dogs suspected to be infected with rabies?		
Yes	12	100
No	0	0

Table 5: Age, sex, breed, and year specific rates of dog vaccination at the Zonal Veterinary Clinic, Aba, Abia state from 2007 – 2012

Variable	2007 (n = 320)	2008 (n=270)	2009 (n =252)	2010 (n= 236)	2011 (n = 158)	2012 (n = 118)	Total
Age (months) (%)							
3-12	122(38.1)	109(40.4)	113(44.8)	111(47.0)	77(48.7)	73(61.9)	605(44.7)
>12 -24	151 (47.2)	104(38.5)	100(39.7)	105(44.5)	72(45.6)	30(25.4)	562(41.5)
> 24	47 (14.7)	57(21.1)	39(15.5)	20(8.5)	9(5.5)	15 (12.7)	187(13.8)
Sex (%)							
Males	215(67.2)	150(55.6)	139(55.2)	125(53.0)	81(51.3)	78(66.1)	788(58.2)
Females	105(32.8)	120(44.4)	113(44.8)	111(47.0)	77(48.7)	40(33.9)	566(41.8)
Breed (%)							
Exotic	117(36.6)	145(53.7)	133(52.8)	131(55.5)	85(53.8)	74(62.7)	685(50.6)
Local	136(42.5)	95(35.2)	96(38.1)	70(29.7)	52(32.9)	24(20.3)	473(34.9)
Cross	67(20.9)	30(11.1)	30(11.9)	35(14.8)	21(13.3)	20(16.9)	203(14.9)
Year (%), n = 1354							
Year Rates	320(23.6)	270(19.9)	252(18.6)	236(17.4)	158(11.7)		

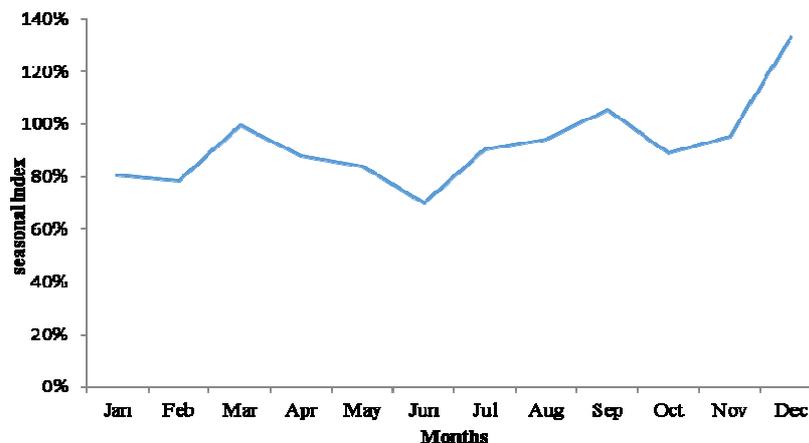
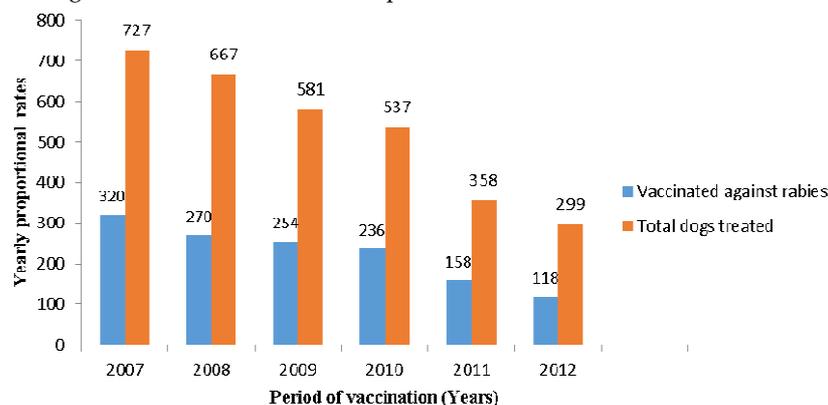
Figure 1: Seasonal index of monthly vaccination of dogs obtained from the Zonal Veterinary Clinic Aba, Abia state during the period 2007 – 2012.**Figure 2:** Annual distribution of dogs presented to the Zonal veterinary Clinic Aba from 2007 – 2012 and the total number of dogs vaccinated against rabies within the same period.

Plate 1: A dog meat processor injured by a matchet when processing dog meat in Umude village Aba, Abia state



DISCUSSIONS

Rabies antigen was detected in 13(7%) of the 185 dog brains tested. This indicates that dogs slaughtered for human consumption could be a source of infection to dog handlers and butchers. Most of the individuals involved in dog meat processing do not utilize personal protective equipment and also the method of slaughter predisposes these dog meat processors to bites from dogs during handling. There was free anti-rabies vaccination campaign in 2007 hence that year recorded the highest number of dogs vaccinated. The high frequency of vaccination of dogs that year gives an indication that the cost of vaccination is one of the factors that discourage most pet owners from vaccinating their dogs yearly against rabies. Study done by Adeyemi and Zessin [14] in Ibadan indicated an increased in rabies vaccination coverage in 1991 and 1992 by over 300% and 200% respectively when there was free vaccination of dogs against rabies. Hence there is need for regular mass vaccination campaign and cost for anti-rabies vaccine should be highly subsidized. The vaccination records also showed that exotic breeds (50.6%) had higher vaccination coverage. This could be due to the large number of exotic breed of dogs in the study area as compared to local and cross breed of dog and also on the special attention paid by dogs owner on the exotic breed of dogs they have. Dogs within the age range of 3-12 months had the highest vaccination coverage (42.2%) than older dogs. This is because most dog owners tend to seek medical consultations for younger dogs than they do for their older dogs, and usually tend to follow the first year vaccination schedule of their dogs; this high

frequency of vaccination among this age group was recorded by Adeyemi et al [15]. Seasonal changes expressed as seasonal index showed the greatest values of vaccination of dogs against rabies during the months November and December corresponding to the period were most dog owners seek medical attention for their pets before travelling for the Christmas holidays.

CONCLUSION

The presence of rabies antigen in the brain tissue of dogs slaughtered for human consumption in Aba, Abia state indicates that dog meat processors are exposed to rabies infection and hence require adequate public health education on the need to adhere to proper safety measures when handling these dogs and a need for regular yearly anti-rabies vaccination. Dog owners should also be educated on the need to vaccinate their dogs yearly.

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CONFLICT OF INTEREST

No conflict of interests was declared by authors.

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